

What is claimed is:

1. A plate system, comprising:

a plate adapted to be applied to the anterior human cervical spine for contacting the anterior aspects of at least two cervical vertebral bodies to be fused, said plate comprising:

at least a first plate segment adapted to be attached to one of the adjacent vertebral bodies to be fused and at least a second plate segment adapted to be attached to another one of the adjacent vertebral bodies to be fused, said at least first and second plate segments adapted to be connected to one another and at least in part overlapped to form said plate, said at least first and second plate segments being in a moveable relationship to one another along a longitudinal axis of said plate, each of said at least first and second plate segments including:

a lower surface adapted to contact at least one of the cervical vertebral bodies and an upper surface opposite said lower surface, said lower surface being concave at least in part along at least a portion of the longitudinal axis of said plate;

at least one bone screw receiving hole extending from said upper surface through said lower surface, each of said bone screw receiving holes adapted to overlie one of the cervical vertebral bodies and being adapted to receive at least one bone screw for engaging the cervical vertebral body to attach said plate to the cervical spine;

at least one fastener adapted to couple together said first and second plate segments, said fastener being non-detachably attached to at least one of said first and second plate segments so as to prevent complete uncoupling of said first and second plate segments from one another, said fastener having a first position adapted to permit said first and second plate segments to move relative to one another along the longitudinal axis of said plate; and

at least one bone screw lock adapted to lock to said plate only a single bone screw inserted in one of said bone screw receiving holes; and

an instrument configured to cooperatively engage said fastener and at least a portion of at least one of said first and second plate segments so as upon movement of said fastener with said instrument said first and second plate segments move relative to one another along the longitudinal axis of said plate.

2. The plate system of claim 1, wherein said instrument includes a working end having at least a first portion configured to cooperatively engage said fastener and at least a second portion offset from said first portion configured to cooperatively engage at least a portion of at least one of said first and second plate segments.
3. The plate system of claim 2, wherein said instrument has a shaft terminating at said working end and having a longitudinal axis, said first portion of said working end being generally aligned with the longitudinal axis of said shaft, and said second portion of said working end being offset from the longitudinal axis of the shaft.
4. The plate system of claim 2, wherein said instrument is configured to rotate said fastener at least in part.
5. The plate system of claim 1, wherein the movement of said first and second plate segments relative to one another provides for movement of the adjacent cervical vertebral bodies toward one another.
6. The plate system of claim 1, wherein said first and second plate segments when attached to the adjacent vertebral bodies, respectively, are adapted to move toward one another in response to movement of the adjacent cervical vertebral bodies toward each other.
7. The plate system of claim 1, wherein said first and second plate segments when attached to the adjacent vertebral bodies, respectively, are adapted to move the adjacent cervical vertebral bodies toward each other.
8. The plate system of claim 1, wherein said first and second plate segments when attached to the adjacent vertebral bodies, respectively, are adapted to maintain a compressive load across a disc space between the adjacent cervical vertebral bodies when said fastener is in a second position.

9. The plate system of claim 1, wherein at least a portion of said upper surface of said second plate segment is convex at least in part along at least a portion of the longitudinal axis of said plate.
10. The plate system of claim 9, wherein said concave lower surface of said first plate segment has a radius of curvature that is different than the radius of curvature of said convex upper surface of said second plate segment.
11. The plate system of claim 1, wherein said at least first and second plate segments are configured to cooperate so as to maintain said first and second plate segments generally aligned along the longitudinal axis of said plate.
12. The plate system of claim 1, wherein said at least first and second plate segments are configured to cooperate so as to limit movement of said first and second plate segments in a direction generally transverse to the longitudinal axis of said plate.
13. The plate system of claim 1, wherein at least a portion of said lower surface of said first plate segment is configured to cooperatively engage at least a portion of said upper surface of said second plate segment.
14. The plate system of claim 1, wherein said at least a portion of said lower surface of said first plate segment is configured to interdigitate with at least a portion of said upper surface of said second plate segment.
15. The plate system of claim 14, wherein said at least a portion of said lower surface of said first plate segment and said at least a portion of the upper surface of said second plate segment include ratchetings.
16. The plate system of claim 15, wherein said ratchetings are configured to permit movement of said first and second plate segments in a first direction toward one another along a mid-longitudinal axis of said plate and to restrict movement in a direction opposite to said first direction.
17. The plate system of claim 1, further comprising at least a third plate segment adapted to be connected to at least one of said first and second plate segments to form said plate.
18. The plate system of claim 17, wherein said third plate segment is an intermediate plate segment configured to be coupled between at least two plate segments.

19. The plate system of claim 1, wherein said fastener has a second position adapted to restrict movement of said first and second plate segments relative to one another along at least one direction along the longitudinal axis of said plate.
20. The plate system of claim 1, wherein said fastener passes through at least a portion of said first and second plate segments.
21. The plate system of claim 1, wherein said fastener is a rivet.
22. The plate system of claim 1, wherein said fastener is at least in part threaded.
23. The plate system of claim 1, wherein said fastener has a head.
24. The plate system of claim 23, wherein said fastener has a shaft.
25. The plate system of claim 1, wherein said at least one bone screw lock is coupled to said plate.
26. The plate system of claim 25, wherein said at least one bone screw lock is removably coupled to said plate.
27. The plate system of claim 25, wherein said at least one bone screw lock is adapted to be coupled to said plate prior to the insertion of the bone screw into said bone screw receiving hole.
28. The plate system of claim 1, wherein said at least one bone screw lock is configured to move from an initial position that permits the insertion of the bone screw into said bone screw receiving hole to a final position that is adapted to extend over at least a portion of the bone screw to retain the bone screw to said plate.
29. The plate system of claim 1, wherein said at least one bone screw lock in the final position covers at least a portion of said bone screw receiving holes.
30. The plate system of claim 1, wherein at least a portion of said at least one bone screw lock slides from the initial position to the final position.
31. The plate system of claim 30, wherein said at least one bone screw lock slides over at least a portion of one of said bone screw receiving holes.
32. The plate system of claim 31, wherein said at least one bone screw lock slides over at least a portion of the bone screws in said bone screw receiving holes.
33. The plate system of claim 1, wherein said at least one bone screw lock comprises at least one of a screw, a rivet, a cap, and a cover.

34. The plate system of claim 1, wherein said at least one bone screw lock has a central longitudinal axis and is adapted to engage a respective one of said bone screw receiving holes with the central longitudinal axis of said at least one bone screw lock being substantially coaxial with the central longitudinal axis of a respective one of said bone screw receiving holes.
35. The plate system of claim 1, wherein said at least one bone screw lock is configured to threadably engage one of said bone screw receiving holes.
36. The plate system of claim 1, wherein said at least one bone screw lock is part of a bone screw configured to threadably engage one of said bone screw receiving holes.
37. The plate system of claim 36, wherein said at least one bone screw lock has threads with different thread pitches.
38. The plate system of claim 1, wherein at least a portion of said lower surface of said first and second plate segment is concave at least in part in a direction generally transverse to the longitudinal axis of said plate.
39. The plate system of claim 38, wherein at least a portion of said lower surface of said first and second plate segments is roughened to promote the growth of bone along said lower surface.
40. The plate system of claim 1, wherein at least a portion of said lower surface of said first and second plate segments comprises a bone ingrowth surface.
41. The plate system of claim 1, wherein at least one of said bone screw receiving holes is configured to form an interference fit with at least a portion of the trailing end of a properly dimensioned bone screw to be received therein.
42. The plate system of claim 1, wherein at least one of said bone screw receiving holes is configured to hold a bone screw in fixed relationship to said plate.
43. The plate system of claim 1, wherein at least one of said bone screw receiving holes is configured to allow a bone screw to be in a moveable relationship to said plate.
44. The plate system of claim 1, wherein at least one of said bone screw receiving holes is configured to allow a bone screw to be in a variable angular relationship to said plate.

45. The plate system of claim 1, wherein at least two of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of a single cervical vertebral body adjacent a disc space to be fused.
46. The plate system of claim 1, in combination with an interbody spinal fusion implant.
47. The plate system of claim 46, wherein said implant comprises at least in part bone.
48. The plate system of claim 46, wherein said implant is an allograft interbody bone graft implant.
49. The plate system of claim 46, wherein said implant is an artificial implant.
50. The plate system of claim 1, in combination with a fusion promoting substance.
51. The plate system of claim 50, wherein said fusion promoting substance is at least in part other than bone.
52. The plate system of claim 50, wherein said fusion promoting substance is at least in part bone.
53. The plate system of claim 50, wherein said fusion promoting substance is hydroxyapatite.
54. The plate system of claim 50, wherein said fusion promoting substance comprises bone morphogenetic protein.
55. The plate system of claim 50, wherein said fusion promoting substance comprises genes coding for the production of bone.
56. The plate system of claim 1, further comprising bone screws for engaging said plate to the cervical spine, wherein at least a portion of one of said plate, said at least one bone screw lock, and said bone screws is a bioresorbable material.
57. The plate system of claim 56, wherein said bioresorbable material is at least in part bone.
58. The plate system of claim 1, in combination with a substance for inhibiting scar formation.
59. The plate system of claim 1, in combination with an antimicrobial material.
60. The plate system of claim 1, wherein said plate is treated with an antimicrobial material.

61. The plate system of claim 1, further comprising at least one bone screw having a leading end for insertion into the cervical spine and a head opposite said leading end, said at least one bone screw lock adapted to contact said head.
62. The plate system of claim 61, wherein at least one of said bone screw receiving holes has a reduced dimension proximate said lower surface of said plate to form a seat, said seat having a substantially planar surface adapted to contact a lower surface of one of said bone screws.
63. The plate system of claim 1, wherein at least one of said plate, said fastener, and said bone screw lock is electrified for purposes of stimulating bone growth and contributing to bone fusion.